

# PATENT ABSTRACTS OF JAPAN

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(71)Applicant : YAMAHA CORP

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(72)Inventor : HONCHI YOSHIKAZU

HIRAI TORU

SHIMIZU YASUSHI

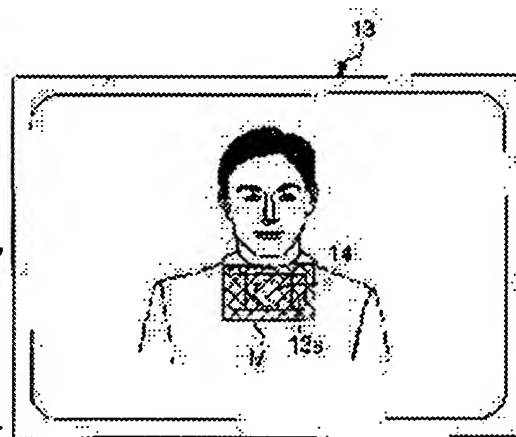
KAWAKAMI FUKUJI

## (54) VIDEO PROJECTING DEVICE AND VIDEO SYSTEM

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To suppress such an unnatural video display that the line of sight of a user is shifted when used in a communication conference system or the like, and to almost completely prevent a video failure such as generation of a flare.

**SOLUTION:** On a screen 13 arranged in a conference room provided with a communication conference system, the video of the partners' conference room is displayed by a video projecting device. In such a case, an aperture part 13a is arranged about in the central part of the screen 13, and a video camera 14 is installed on the rear side of this aperture part 13a. Then, a video photographed by this video camera 14 is transmitted to the partners' side, and the video projecting device to project the video on the screen 13 always projects a black picture on the aperture part 13a, the light projected by the video projecting device is thereby prevented from being made incident on the video camera 14.



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CLAIMS

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## [Claim(s)]

[Claim 1] A mask image superposition means to be image projection equipment which projects an image on a screen, and to superimpose the mask image which makes a part of the image black in the image corresponding to a video signal according to a video signal, A projection means to project the image superimposed on the mask image by said mask image superposition means on said plane of projection, It is image projection equipment which possesses a brightness input means to input the luminance signal which shows the brightness of an image, and is characterized by said mask image superposition means adjusting the location of the mask image superimposed in the image corresponding to said video signal based on the luminance signal inputted by said brightness input means.

[Claim 2] Said brightness input means is image projection equipment according to claim 1 characterized by acquiring the luminance signal which shows the brightness of the image corresponding to the video signal concerned from the video signal supplied from the outside.

[Claim 3] The screen which has opening, and the image projection equipment which is arranged at the front-face side of said screen, and projects an image on the front face of said screen according to a video signal, In the visual system possessing the photography equipment which is arranged at the rear-face side of said screen of said opening, photos the front-face side of said screen from the rear-face side of said screen, and outputs a photography video signal A mask image superposition means by which said image projection equipment superimposes the mask image which makes a part of the image black in the image corresponding to a video signal, A projection means to project the image superimposed on the mask image by said mask image superposition means on said screen, It has a brightness input means to input the luminance signal which shows the brightness of the image corresponding to the photography video signal concerned, from the photography video signal outputted by said photography equipment. Said mask image superposition means The visual system characterized by adjusting the location of the mask image superimposed in the image corresponding to said video signal based on the luminance signal inputted by said brightness input means. black  
adjust location

[Claim 4] Said mask image superposition means is the visual system according to claim 3 characterized by to make said mask image superimpose on a superposition location when the superposition location of said mask image is adjusted and a luminance signal with the smallest brightness is inputted with reference to the luminance signal by which was made to move the superposition location of said mask image over the image whole region corresponding to said video signal, and the sequential input was carried out with said brightness input means on the occasion of this migration.

[Claim 5] Said mask image superposition means is a visual system according to claim 4 characterized by making the image of a predetermined alphabetic character, a pattern, or both accompany said mask image, and making it move to it when moving said mask image over the image whole region corresponding to said video signal and adjusting the location of said mask image.

[Claim 6] Said projection means is a visual system according to claim 4 or 5 characterized by projecting the image of high brightness on the front face of said screen when adjusting the location of said mask image.

[Claim 7] The screen which has opening, and the image projection equipment which is arranged at the front-face side of said screen, and projects an image on the front face of said screen according to a video signal, In the visual system possessing the photography equipment which is arranged at the rear-face side of said screen of said opening, photos the front-face side of said screen from the rear-face side of said screen, and outputs a photography video signal A mask image superposition means to superimpose the mask image which said image projection equipment is an image corresponding to a video signal, and makes black the location corresponding to said opening in the image projected on the front face of said screen, The visual system characterized by providing a projection means to project the image superimposed on the mask image by said mask image superposition means on said screen.

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[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the visual system equipped with the image projection equipment which projects an image on a screen etc., and image projection equipment.

[0002]

[Description of the Prior Art] In recent years, the teleconference system which holds a conference between remote places is spreading. as shown in drawing 8, in a teleconference system, the graphic display device 2 which the remote place which holds a conference is alike, respectively, and displays the camera 1 and image for photography is formed, and while transmitting the video signal which the camera 1 photoed to the other party, a graphic display device 2 displays the image according to the video signal transmitted through a communication network etc. from the camera 1 of the other party. The image of the other party is expressed to the graphic display device 2 formed in each remote place by doing in this way as real time, and a conference can be held between remote places.

[0003]

[Problem(s) to be Solved by the Invention] By the way, in the teleconference system shown in drawing 8, User A and User B will hold a conference, looking at the image displayed on a graphic display device 2, respectively. However, in the teleconference system shown in drawing 8, since the camera 1 is arranged at the upper part side of a graphic display device 2, the look of User A and User B photoed with the camera 1 will turn to the bottom. And the image of the user from whom the look shifted in this way will be displayed on the graphic display device 2 of the other party, the look of User A and User B stops being in agreement, and an unnatural impression will be given to both users.

[0004] Then, in order to prevent a gap of the look of the user who performs a teleconference, the teleconference system as shown in drawing 9 is developed. As shown in this drawing, in this teleconference system, the image corresponding to the video signal transmitted from the other party is displayed on the screen 6 using the image projection equipments 5, such as a projector. the screen 6 with which the image photoed by the other party is displayed -- opening 6a is mostly prepared in the central part, and the camera 7 is arranged at the rear-face side of this opening 6a. If it does in this way and the user is looking at the screen 6, the user's look will turn to a camera 7. Therefore, the user who had the look with the camera 7 will be photoed, and it will be transmitted to the image projection equipment (un-illustrating) of the other party.

[0005] However, in the teleconference system shown in drawing 9, since it is arranged in the location where the image projection equipment 5 and the camera 7 of what can prevent a gap of a user's look counter, the light which image projection equipment 5 emits will carry out incidence to a camera 7. Thus, if the light which image projection equipment 5 emits carries out incidence to a camera 7, the flare with which the image photoed by the camera 7 by this incident light is confused will be generated. That is, the image which it is transmitted to the other party and projected will become the disordered thing which the flare generated. The generated flare will become large when the image especially projected near the opening 6a in a screen 6 is an image with large brightness, such as white. Moreover, although

the generated flare becomes small in the dark color [ image / which is projected on about six screen ], since the attitude of the flare changes with the images projected, the image which is very hard to see will project.

[0006] In order to reduce turbulence of the image resulting from the light which such image projection equipment 5 emits, the difference of elevation of the location in which image projection equipment 5 is installed, and the location of opening 6a is enlarged, and the method of reducing the amount of incidence to the camera 7 of the light which image projection equipment 5 emits is used. By this approach, although the amount of incidence of the light to a camera 7 can be reduced to some extent, incidence to the camera 7 of light cannot be prevented nearly completely. Moreover, when the installation conditions which can take sufficient difference of elevation for image projection equipment 5 and the installation location of opening 6a are needed, for example, it installs in the room where head lining is low, the above-mentioned large difference of elevation cannot be taken.

[0007] Moreover, as shown in drawing 10, there is also a method of reducing the amount of incidence to the camera 7 of the light which image projection equipment 5 emits by arranging cut mask 6b on the edge of an opening 6a top, and adjusting the attaching position of this cut mask 6b. According to this approach, also when the big difference of elevation cannot be taken in image projection equipment 5 and the installation location of opening 6a, the amount of incidence of the camera 7 of the light which image projection equipment 5 emits can be reduced to some extent, but incidence to the camera 7 of projection light cannot be prevented nearly completely. Moreover, cut mask 6b attached in order to reduce the amount of incidence to a camera 7 will make opening area of opening 6a small, and the field angle which can be photoed with a camera 7 will decrease.

[0008] Moreover, a deviation filter is installed in the location ahead of image projection equipment 5, and the location between opening 6a and a camera 7, respectively, and the technique of reducing the light which image projection equipment 5 emits carrying out incidence to a camera 7 is indicated by JP,6-233290,A. However, by this approach, the quantity of light for projecting an image on a screen 6 with image projection equipment 5 decreases with the deviation filter arranged ahead of image projection equipment 5, and there is a problem that the image projected on a screen 6 will become dark. In this case, although it is possible to make legible the image projected by making the interior of a room dark, if it carries out like this, it will lapse into vicious circle that the image photoed with the indoor camera 7 concerned becomes dark.

[0009] Moreover, with the equipment indicated by JP,7-143469,A, the image pick-up section is arranged to the rear-face side of a display, the period which increases the transparency of a display, and the period which displays on usual are changed, and the image pick-up section is picturizing the front-face side of a display during the period when transparency is increasing. With this equipment, since the image pick-up section is arranged at the rear-faces side, such as four directions of a display, the look of the user who looks at a display will turn to the image pick-up section, but since the period which increases transparency, and the period to display are changed, turbulence that a display image flickers arises.

[0010] This invention aims at offering the image projection equipment and the visual system which can prevent the fault of images, such as generating of the flare, nearly completely while it controls that an unnatural image, like a user's look shifts copies out, when it is made in consideration of the above-mentioned situation and used for a teleconference system etc.

[0011]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the image projection equipment of this invention according to claim 1 A mask image superposition means to be image projection equipment which projects an image on a screen, and to superimpose the mask image which makes a part of the image black in the image corresponding to a video signal according to a video signal, A projection means to project the image superimposed on the mask image by said mask image superposition means on said plane of projection, A brightness input means to input the luminance signal which shows the brightness of an image is provided, and said mask image superposition means is characterized by adjusting the location of the mask image superimposed in the image corresponding to said video signal based on the luminance signal inputted by said brightness input means.

[0012] Moreover, image projection equipment according to claim 2 is characterized by said brightness input means acquiring the luminance signal which shows the brightness of the image corresponding to the video signal concerned from the video signal supplied from the outside in image projection equipment according to claim 1.

[0013] Moreover, the screen with which a visual system according to claim 3 has opening, The image projection equipment which is arranged at the front-face side of said screen, and projects an image on the front face of said screen according to a video signal, In the visual system possessing the photography equipment which is arranged at the rear-face side of said screen of said opening, photos the front-face side of said screen from the rear-face side of said screen, and outputs a photography video signal A mask image superposition means by which said image projection equipment superimposes the mask image which makes a part of the image black in the image corresponding to a video signal, A projection means to project the image superimposed on the mask image by said mask image superposition means on said screen, It has a brightness input means to input the luminance signal which shows the brightness of the image corresponding to the photography video signal concerned, from the photography video signal outputted by said photography equipment. Said mask image superposition means It is characterized by adjusting the location of the mask image superimposed in the image corresponding to said video signal based on the luminance signal inputted by said brightness input means.

[0014] A visual system according to claim 4 is set to a visual system according to claim 3. Moreover, said mask image superposition means When adjusting the superposition location of said mask image, the superposition location of said mask image is moved over the image whole region corresponding to said video signal. It is characterized by making said mask image superimpose on a superposition location when a luminance signal with the smallest brightness is inputted with reference to the luminance signal by which the sequential input was carried out with said brightness input means on the occasion of this migration.

*adjust to*  
[0015] Moreover, when said mask image superposition means moves said mask image over the image whole region corresponding to said video signal and a visual system according to claim 5 adjusts the location of said mask image in a visual system according to claim 4, it is characterized by making the image of a predetermined alphabetic character, a pattern, or both accompany said mask image, and moving it to it.

[0016] Moreover, the visual system according to claim 6 is characterized by said projection means projecting the image of high brightness on the front face of said screen, when adjusting the location of said mask image in the visual system according to claim 4 or 5.

[0017] Moreover, the screen with which a visual system according to claim 7 has opening, The image projection equipment which is arranged at the front-face side of said screen, and projects an image on the front face of said screen according to a video signal, In the visual system possessing the photography equipment which is arranged at the rear-face side of said screen of said opening, photos the front-face side of said screen from the rear-face side of said screen, and outputs a photography video signal A mask image superposition means to superimpose the mask image which said image projection equipment is an image corresponding to a video signal, and makes black the location corresponding to said opening in the image projected on the front face of said screen, It is characterized by providing a projection means to project the image superimposed on the mask image by said mask image superposition means on said screen.

[0018]

[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained with reference to a drawing.

A. \*\*\*\* of an operation gestalt -- drawing 1 is drawing showing the outline configuration of the teleconference system equipped with the visual system concerning 1 operation gestalt of this invention first. As shown in this drawing, in this teleconference system, the visual system 10 is installed in two conference room 11a in the distant location, and conference room 11b, and User A and User B hold a conference using the teleconference system equipped with these visual systems 10.

[0019] The visual system 10 installed in each conference rooms 11a and 11b as shown in this drawing is

equipped with the image projection equipment 12 attached in head lining etc., the screen 13, and the video camera 14. The video signal photoed with the video camera 14 of the other party is supplied to image projection equipment 12, and the image corresponding to the video signal which the video camera 14 of the other party photoed by this is projected on a screen 13.

[0020] The video signal Va specifically photoed with the video camera 14 installed in conference room 11a is supplied through the communication network which is not illustrated to the image projection equipment 12 installed in conference room 11b. Thereby, the image of the user A who is in conference room 11a is projected on the screen 13 in conference room 11b. The video signal Vb photoed on the other hand with the video camera 14 installed in conference room 11b is supplied through the communication network which is not illustrated to the image projection equipment 12 installed in conference room 11a. Thereby, the image of the user B who is in conference room 11b is projected on the screen 13 in conference room 11a. Thus, User A and User B can see the image of the other party on a screen 13. Here, although illustration is not carried out, the microphone is installed in conference room 11a and conference room 11b, and the speech information in each conference room 11a acquired with the microphone concerned and 11b is supplied and reproduced by the voice regenerative apparatus installed in the conference room of the other party. Therefore, User A and User B can recognize the image and voice of the other party which are present in a remote place, and can hold the meeting between remote places now.

[0021] Moreover, although justification of the mask image for the video signal from the video camera 14 installed in the same conference room also being supplied, and preventing turbulence of a photography image using this video signal is performed to each image projection equipment 12, about this, it mentions later.

[0022] Here, drawing 2 is the front view showing the screen 13 of a visual system 10. it is shown in drawing 1 and drawing 2 -- as -- a screen 13 -- rectangle-like opening 13a is mostly formed in the central part, and the video camera 14 is installed in the rear-face side of the screen 13 of this opening 13a. The look of the user who looks at the image projected on the screen 13 by this will be turned to a nature and video camera 14 side. Therefore, a look will be turned to the user side who a user's look projected on the screen 13 of the other party swerves to neither a top nor the bottom, and looks at a screen 13. Therefore, the user A who is in conference room 11a and conference room 11b, and User B can hold a meeting etc. not in the condition from which the mutual look swerved unnaturally but in the condition that there is no sense of incongruity that a look is in agreement.

[0023] Thus, in the teleconference system equipped with the visual system 10 concerning this operation gestalt, it can prevent that the look of the user using the teleconference system concerned will shift unnaturally by arranging a video camera 14 to the rear-face side of opening 13a of a screen 13 mostly prepared in the central part. However, if the light which image projection equipment 12 emits carries out incidence to a video camera 14 as mentioned above, the flare will be generated on the image photoed with the video camera 14. So, it is not concerned with the contents of the image corresponding to the video signal supplied from the video camera 14 of the other party, but as shown in drawing 3, image projection equipment 12 is always made to project the mask image M (mesh line part in drawing) which is a black image on the part of opening 13a of a screen 13 with this operation gestalt (light is not applied in fact). It is lost by this that the light from image projection equipment 12 carries out incidence to a video camera 14 for almost, and generating of the flare mentioned above can be removed nearly completely. It explains referring to drawing 4 hereafter about the configuration of the image projection equipment 12 which makes such a mask image M project on the part of opening 13a on a screen 13. In addition, the image projection equipment 12 of the visual system 10 installed in conference room 11a here is explained.

[0024] As shown in this drawing, image projection equipment 12 is equipped with the image superposition section 50, the mask image control section 51, the Y/C separation circuit 52, the display and control section 53, and the control unit 54.

[0025] By superimposing the mask image corresponding to the mask image information Vm supplied from the mask image control section 51, the image superposition section 50 generates the superposition



video signal Vj on the image corresponding to the video signal Vb supplied from the video camera 14 (it installs in conference room 11b) of the other party, and outputs it to it at a display and control section 53.

[0026] The mask image control section 51 controls the location which superimposes the size of a mask image, a configuration, and a mask image according to the directions from the user through a control unit 54, and outputs the mask image information Vm which is the image information according to these contents of control to the image superposition section 50. In the image superposition section 50, the mask image M of a configuration and size which followed the mask image information Vm in this way will be superimposed in the superposition location according to the mask image information Vm.

Therefore, a user can adjust the superposition location of the mask image M, a configuration, size, etc. so that the mask image M may cover opening 13a of a screen 13, as the control unit 54 was operated and mentioned above.

[0027] Moreover, a mask image control section 51 can perform the regulating processing which adjusts the superposition location of a mask image automatically so that a mask image may be projected on the part of opening 13a, and when this regulating processing is performed, it not only performs adjustment processing of the mask image by directions of the user through the control unit 54 which was mentioned above, but outputs the mask image information Vm generated by the processing concerned to the image superposition section 50. Here, although the luminance signal K supplied from the Y/C separation circuit 52 will be used in case regulating processing is performed, the detail about this regulating processing is mentioned later.

[0028] The Y/C separation circuit 52 divides into Y (brightness) signal and C (chroma) signal the video signal Va supplied from this image projection equipment 12 and the video camera 14 installed in the same room. Thus, the luminance signal acquired from the video signal Va is outputted to the mask image control section 51 by dissociating. That is, the luminance signal showing the brightness of the image photoed with the video camera 14 installed in conference room 11a is acquired, and this is outputted to the mask image control section 51.

[0029] A display and control section 53 is the same configuration as the display and control section of usual common image projection equipment, and projects the image corresponding to the superposition video signal Vj supplied from the image superposition section 50 on a screen 13. If a concrete configuration is illustrated, it will have the liquid crystal display panel corresponding to the three primary colors of R (red), G (green), and B (blue), and the image corresponding to the superposition video signal Vj supplied to these liquid crystal display panels from the image superposition section 50 will be displayed. Thus, the light source irradiates light at the liquid crystal display panel by which the image corresponding to the superposition video signal Vj is displayed, and it is projected on the image which penetrated these liquid crystal display panels by the screen 13. That is, as shown in drawing 3, the image superimposed on the mask image M in the image corresponding to the video signal Vb supplied from the video camera 14 of the other party is projected on a screen 13.

[0030] B. It is the teleconference structure of a system equipped with the visual system 10 concerning this operation gestalt which was explained beyond superposition justification processing of a mask image, and when a user operates a control unit 54, the location which makes the mask image M superimpose in the image corresponding to the video signal Vb supplied from the other party can be adjusted. Therefore, if the location of the mask image M is adjusted so that the mask image M may be projected on the part of opening 13a of a screen 13 as shown in drawing 3, the incidence of the light which image projection equipment 12 emits is prevented by the video camera 14 arranged at the rear-face side of opening 13a, and it can prevent that the flare is generated in the image (image projected on the screen 13 of the other party) photoed with the video camera 14 concerned.

[0031] Moreover, with the image projection equipment 12 in this operation gestalt, also besides a user's manual operation mentioned above adjusting the superposition location of the mask image M, image projection equipment 12 is possible also for performing regulating processing which adjusts the superposition location of the mask image M so that the mask image M may be automatically projected on the part of opening 13a, and it explains the contents of this regulating processing hereafter. In

addition, what is necessary is just made to perform regulating processing to the case where there are directions of the purport which performs regulating processing from a user, a power up, etc.

[0032] If regulating processing is started as shown in drawing 5, the mask image control section 51 will move the location of the mask image M, as the drawing Nakaya mark shows [ from the initial valve position shown according to a mesh line ] the mask image M projected on a screen 13 over the image whole region projected on a screen 13 to condition, such as a location of M1, a location of M2, and a location of M3, one by one. Sequential generation of the superposition video signal Vj with which the superposition location of the mask image M shifted in the image superposition section 50 is carried out by specifically carrying out sequential supply of the mask image information Vm to which the mask image control section 51 shifted the superposition location at the image superposition section 50. Thus, by supplying the superposition video signal Vj generated to the sequential display-control section 53, the location of the mask image M projected on a screen 13 is moved. Thus, while moving the mask image M, in addition to the mask image information Vm, the mask image M supplies the video signal Vc for adjustment for displaying the image of high brightness, for example, a white image, on the whole region on a screen 13 to the image superposition section 50. Therefore, in the image superposition section 50, the superposition video signal Vj with which it was superimposed in the whole region on the mask image M according to the mask image information Vm in the white image will be generated.

[0033] The mask image control section 51 records serially on memory the brightness shown in the luminance signal supplied from the Y/C separation circuit 52, while both moving the mask image M as if sequential supply of the mask image information Vm is carried out in order to shift a superposition location in the image superposition section 50, as mentioned above. Here, the mask image control section 51 matches and memorizes the brightness shown in the luminance signal supplied from the Y/C separation circuit 52 when it was in the superposition location (for example, coordinate information) and its superposition location of the mask image M which carries out sequential migration over the image whole region on a screen 13, as shown in drawing 6.

[0034] And after migration of the mask image M covering the image whole region projected on a screen 13 is completed, the mask image control section 51 specifies the smallest thing out of the brightness it was remembered that mentioned above, and pinpoints the superposition location of the mask image M corresponding to the brightness concerned. Thus, the pinpointed superposition location is made into a proper superposition location, and regulating processing is ended.

[0035] And if a video signal Vb is supplied from the video camera 14 of the other party and a teleconference etc. is started, the mask image information Vm for the mask image M to make it superimposing on the superposition location pinpointed as mentioned above will be generated, and the image superposition section 50 will be supplied. Thereby in the image superposition section 50, the superposition video signal Vj with which the location pinpointed in the image corresponding to a video signal Vb as mentioned above was overlapped on the mask image M is generated. Therefore, the mask image M will be projected on the location which was not concerned with the contents of an image of the video signal Vb supplied from the video camera 14 of the other party, but was pinpointed on the screen 13 as mentioned above.

[0036] The superposition location of the mask image M specified by regulating processing mentioned above is a location which laps with the part of opening 13a on a screen 13, and the image projected on a screen 13 after regulating processing turns into an image by which the mask image M was projected on the part of opening 13a as shown in drawing 3. Thus, the reason of an above specific location being a location which laps with the part of opening 13a is as follows.

[0037] In the regulating processing mentioned above, while the whole region is making the white image project on a screen 13, sequential migration of the mask image M is carried out. Therefore, the brightness of the image photoed with the video camera 14 arranged at the rear-face side of this opening 13a differs greatly in the time of the mask image M being projected on locations other than opening 13a, and the time of the mask image M being projected on the part of opening 13a. That is, when the mask image M is projected on the part of opening 13a (i.e., when incidence of the light is not carried out to the part of opening 13a), to a video camera 14, the direct incidence of the light which image projection

equipment 12 emits is lost, and the brightness of the image photoed at this time becomes small clearly rather than the time of the mask image M being projected on other locations. Therefore, the location of the mask image M as mentioned above, when a luminance signal becomes the smallest can distinguish that it is the location projected on the part of opening 13a.

[0038] With this operation gestalt, it becomes possible by preparing opening 13a in the center section of the screen 13, and installing a video camera 14 in the rear-face side of the opening 13a concerned to control an unnatural gap of the look of the user who holds a conference in a remote place. Thus, although turbulence of the photography image by the projection light of image projection equipment 12 poses a problem when opening 13a is prepared and the video camera 14 has been arranged, with this operation gestalt, by making the mask image M superimpose on the part of opening 13a on the image projected on a screen 13, the direct incidence of the light to a video camera 14 can be prevented, and it can remove nearly completely that the flare is generated in a photography image. That is, with this operation gestalt, the problem of a gap of each user's look can be solved, without generating the flare in the photography image by projection light.

[0039] Moreover, in order to prevent the flare in the photography image by the video camera 14, it is not necessary to prepare the big difference of elevation of image projection equipment 12 and opening 13a, and cannot be concerned with installation conditions, such as the interior of a room where head lining is low, but can prevent that the flare in a photography image is always generated. Moreover, since it is not concerned with the contents of an image (it is bright and are dark) which image projection equipment 12 projects but the mask image M is always projected on the part of opening 13a, generating of the flare can always be prevented.

[0040] Moreover, since there is no need of preparing a cut mask etc. and making size of opening 13a small in order to reduce the light which image projection equipment 12 emits carrying out direct incidence to a video camera 14 (referring to drawing 10 ), the field angle of a video camera 14 can fully be taken.

[0041] Moreover, a user can make the mask image M superimpose on a proper location with this operation gestalt, since regulating processing which was mentioned above can be performed, without performing actuation of adjusting the location of the mask image M.

[0042] C. It is not limited to the operation gestalt which is a modification and which mentioned this invention above, and the following various deformation is possible.

[0043] (Modification 1) In the operation gestalt mentioned above, although the mask image M was a rectangle-like, the configurations of the mask image M may be other configurations, such as not only this but circular, an ellipse form, a square, etc. Moreover, what is necessary is to carry out other type preparation of the configuration of the mask image M beforehand, and for a user to operate a control unit 54 and just to enable it to set up the configuration of the mask image M according to the configuration of opening 13a.

[0044] (Modification 2) Again, with the operation gestalt mentioned above, although he was trying for regulating processing to adjust the superposition location of the mask image M, it is it made to carry out to regulate automatically of the size of not only a superposition location but the mask image M. In this case, beforehand, the whole region on a screen 13 is moved for the mask image M of larger size, and as mentioned above, after pinpointing a superposition location, in the pinpointed superposition location, size of the mask image M is made small one by one. And what is necessary is just to let size just before the brightness shown in the luminance signal acquired while making size of the mask image M small changes brightly be proper size. The size of the mask image M from which, as for this, brightness changed brightly is because it is thought that it is smaller than the size of opening 13a, and the light of image projection equipment 12 is carrying out direct incidence to the video camera 14. Therefore, if size just before brightness changes is considered that the size of the mask image M is not large beyond the need and it is set as this size, becoming the hindrance of the image which the mask image M should project can also reduce it, while the mask image M can cover opening 13a.

[0045] (Modification 3) The migration direction etc. is [ that the mask image M should just move in the whole region of the image on a screen 13 ] arbitrary although he is trying to make the sequential

migration of the image on a screen 13 carry out the mask image M in the vertical direction by the regulating processing in the operation gestalt mentioned above again (refer to the arrow head in drawing 5 ). Moreover, in case the mask image M under regulating processing is moved, patterns, such as the character as shown in alphabetic characters and drawing 7 , such as a firm name and a trade name, are combined with the mask image M, and you may make it move them in addition to the mask image M. If it does in this way, there shall be effect that the image projected on a screen 13 is not the insipid thing that the mask image M which is a black image moves onto white, and the character of an animal etc. moves during regulating processing.

[0046] (Modification 4) With the operation gestalt mentioned above, although image projection equipment 12 equipped with the regulating function to adjust the location of the mask image M automatically was explained, in the case of the visual system 10 whose physical relationship of image projection equipment 12, a screen 13, and a video camera 14 is always immobilization, you may not have the function adjust the location which superimposes the mask image M again. In this case, what is necessary is asking for the superposition location where the mask image's M is beforehand projected on the part of opening 13a of a screen 13, and making it just make the mask image M superimpose on this location.

[0047] (Modification 5) With the operation gestalt mentioned above, in the regulating processing which carries out regulating automatically of the location of a mask image, although a white image is made to project on the whole region and he was trying to move the superposition location of the mask image to the inside of this white image, if the image made to project on the whole region is an image of not only white but high brightness, the almost same effectiveness as the case of white will be acquired again.

[0048]

[Effect of the Invention] While controlling that an unnatural image, like a user's look shifts copies out according to this invention when it is used for a teleconference system etc. as explained above, it becomes possible to prevent the fault of the image of the flare being generated nearly completely.

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[Translation done.]

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TECHNICAL FIELD

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[Field of the Invention] This invention relates to the visual system equipped with the image projection equipment which projects an image on a screen etc., and image projection equipment.

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[Translation done.]

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PRIOR ART

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[Description of the Prior Art] In recent years, the teleconference system which holds a conference between remote places is spreading. as shown in drawing 8 , in a teleconference system, the graphic display device 2 which the remote place which holds a conference is alike, respectively, and displays the camera 1 and image for photography is formed, and while transmitting the video signal which the camera 1 photoed to the other party, a graphic display device 2 displays the image according to the video signal transmitted through a communication network etc. from the camera 1 of the other party. The image of the other party is expressed to the graphic display device 2 formed in each remote place by doing in this way as real time, and a conference can be held between remote places.

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[Translation done.]

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**EFFECT OF THE INVENTION**

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[Effect of the Invention] While controlling that an unnatural image, like a user's look shifts copies out according to this invention when it is used for a teleconference system etc. as explained above, it becomes possible to prevent the fault of the image of the flare being generated nearly completely.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is drawing showing the outline configuration of the teleconference system equipped with the visual system concerning 1 operation gestalt of this invention.

[Drawing 2] It is the front view showing the screen which is said image structure-of-a-system element.

[Drawing 3] The image projection equipment which is said image structure-of-a-system element is drawing showing the image projected on said screen.

[Drawing 4] It is the block diagram showing the configuration of said image projection equipment.

[Drawing 5] It is drawing for explaining regulating processing of the superposition location of the mask image performed by said image projection equipment.

[Drawing 6] It is drawing showing the configuration of the memory remembered to be the superposition location of a mask image, and the brightness of an image at the time of superposition justification processing of said mask image.

[Drawing 7] It is drawing for explaining regulating processing of the superposition location of said mask image by the modification of said visual system.

[Drawing 8] It is drawing showing the outline configuration of the conventional teleconference system.

[Drawing 9] It is drawing for explaining other conventional teleconference systems.

[Drawing 10] It is drawing for explaining the teleconference system of conventional others.

[Description of Notations]

10 [ .. A screen, 13a / .. Opening, 14 / .. A video camera, 50 / .. The image superposition section, 51 / .. A mask image control section, 52 / .. A Y/C separation circuit, 53 / .. A display and control section, 54 / .. A control unit, M / .. Mask image ] .... A visual system, 11a, 11b .. A conference room, 12 .. Image projection equipment, 13

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[Translation done.]



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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] By the way, in the teleconference system shown in drawing 8 , User A and User B will hold a conference, looking at the image displayed on a graphic display device 2, respectively. However, in the teleconference system shown in drawing 8 , since the camera 1 is arranged at the upper part side of a graphic display device 2, the look of User A and User B photoed with the camera 1 will turn to the bottom. And the image of the user from whom the look shifted in this way will be displayed on the graphic display device 2 of the other party, the look of User A and User B stops being in agreement, and an unnatural impression will be given to both users.

[0004] Then, in order to prevent a gap of the look of the user who performs a teleconference, the teleconference system as shown in drawing 9 is developed. As shown in this drawing, in this teleconference system, the image corresponding to the video signal transmitted from the other party is displayed on the screen 6 using the image projection equipments 5, such as a projector. the screen 6 with which the image photoed by the other party is displayed -- opening 6a is mostly prepared in the central part, and the camera 7 is arranged at the rear-face side of this opening 6a. If it does in this way and the user is looking at the screen 6, the user's look will turn to a camera 7. Therefore, the user who had the look with the camera 7 will be photoed, and it will be transmitted to the image projection equipment (un-illustrating) of the other party.

[0005] However, in the teleconference system shown in drawing 9 , since it is arranged in the location where the image projection equipment 5 and the camera 7 of what can prevent a gap of a user's look counter, the light which image projection equipment 5 emits will carry out incidence to a camera 7. Thus, if the light which image projection equipment 5 emits carries out incidence to a camera 7, the flare with which the image photoed by the camera 7 by this incident light is confused will be generated. That is, the image which it is transmitted to the other party and projected will become the disordered thing which the flare generated. The generated flare will become large when the image especially projected near the opening 6a in a screen 6 is an image with large brightness, such as white. Moreover, although the generated flare becomes small in the dark color [ image / which is projected on about six screen ], since the attitude of the flare changes with the images projected, the image which is very hard to see will project.

[0006] In order to reduce turbulence of the image resulting from the light which such image projection equipment 5 emits, the difference of elevation of the location in which image projection equipment 5 is installed, and the location of opening 6a is enlarged, and the method of reducing the amount of incidence to the camera 7 of the light which image projection equipment 5 emits is used. By this approach, although the amount of incidence of the light to a camera 7 can be reduced to some extent, incidence to the camera 7 of light cannot be prevented nearly completely. Moreover, when the installation conditions which can take sufficient difference of elevation for image projection equipment 5 and the installation location of opening 6a are needed, for example, it installs in the room where head lining is low, the above-mentioned large difference of elevation cannot be taken.

[0007] Moreover, as shown in drawing 10 , there is also a method of reducing the amount of incidence to the camera 7 of the light which image projection equipment 5 emits by arranging cut mask 6b on the

edge of an opening 6a top, and adjusting the attaching position of this cut mask 6b. According to this approach, also when the big difference of elevation cannot be taken in image projection equipment 5 and the installation location of opening 6a, the amount of incidence of the camera 7 of the light which image projection equipment 5 emits can be reduced to some extent, but incidence to the camera 7 of projection light cannot be prevented nearly completely. Moreover, cut mask 6b attached in order to reduce the amount of incidence to a camera 7 will make opening area of opening 6a small, and the field angle which can be photoed with a camera 7 will decrease.

[0008] Moreover, a deviation filter is installed in the location ahead of image projection equipment 5, and the location between opening 6a and a camera 7, respectively, and the technique of reducing the light which image projection equipment 5 emits carrying out incidence to a camera 7 is indicated by JP,6-233290,A. However, by this approach, the quantity of light for projecting an image on a screen 6 with image projection equipment 5 decreases with the deviation filter arranged ahead of image projection equipment 5, and there is a problem that the image projected on a screen 6 will become dark. In this case, although it is possible to make legible the image projected by making the interior of a room dark, if it carries out like this, it will lapse into vicious circle that the image photoed with the indoor camera 7 concerned becomes dark.

[0009] Moreover, with the equipment indicated by JP,7-143469,A, the image pick-up section is arranged to the rear-face side of a display, the period which increases the transparency of a display, and the period which displays on usual are changed, and the image pick-up section is picturizing the front-face side of a display during the period when transparency is increasing. With this equipment, since the image pick-up section is arranged at the rear-faces side, such as four directions of a display, the look of the user who looks at a display will turn to the image pick-up section, but since the period which increases transparency, and the period to display are changed, turbulence that a display image flickers arises.

[0010] This invention aims at offering the image projection equipment and the visual system which can prevent the fault of images, such as generating of the flare, nearly completely while it controls that an unnatural image, like a user's look shifts copies out, when it is made in consideration of the above-mentioned situation and used for a teleconference system etc.

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[Translation done.]

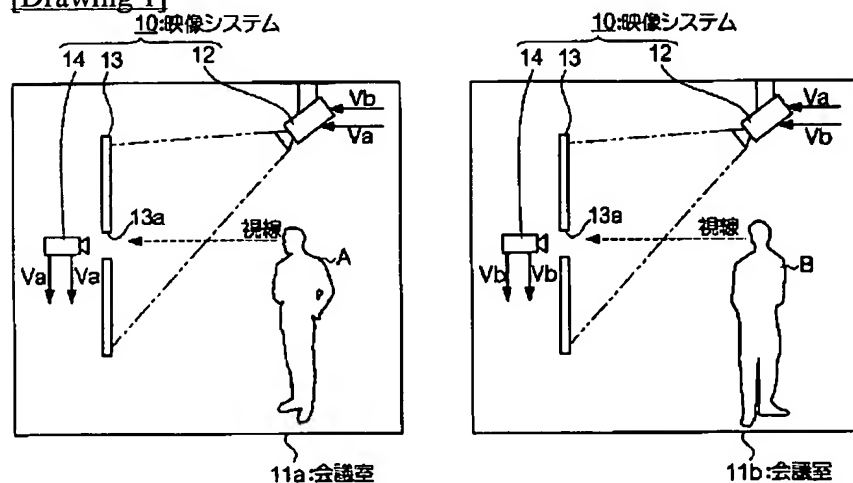
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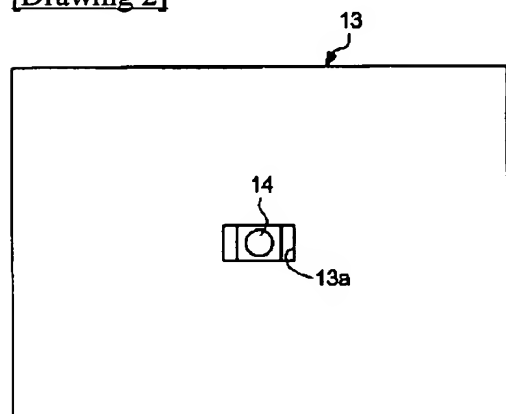
## DRAWINGS

[Drawing 1]



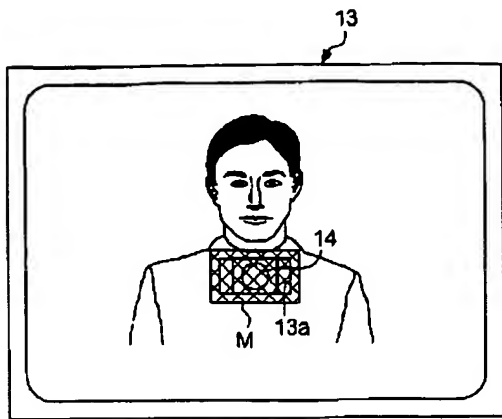
10: Visual system  
 11a/11b: Conference room  
 12: Image projection  
 equipment  
 13: Screen  
 14: Camera

[Drawing 2]



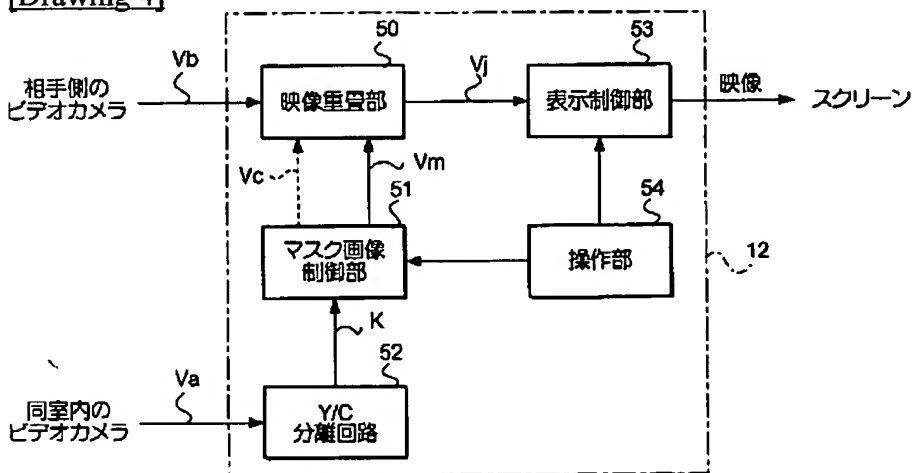
[Drawing 3]

Drawing 3



M: mask image

[Drawing 4]



50: Image superposition section

51: Mask image control section

53: display control section

Vm: mask image information

Vj: Super position video signal

Vb: Video signal supplied from camera 14

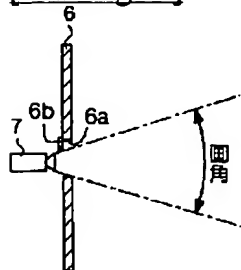
54: Control unit

K: luminance signal

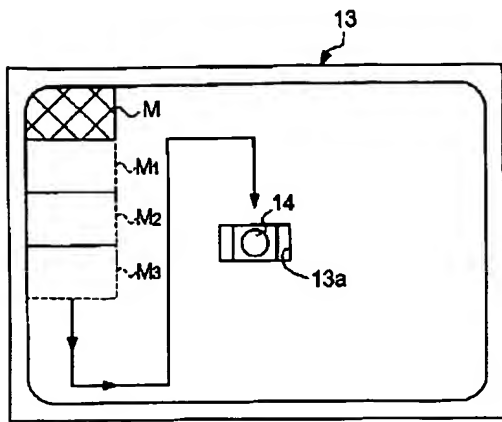
[Drawing 6]

重畳位置	輝度
(x1, y1)	〇〇
(x1, y2)	〇〇
(x1, y3)	〇〇
⋮	⋮

[Drawing 10]

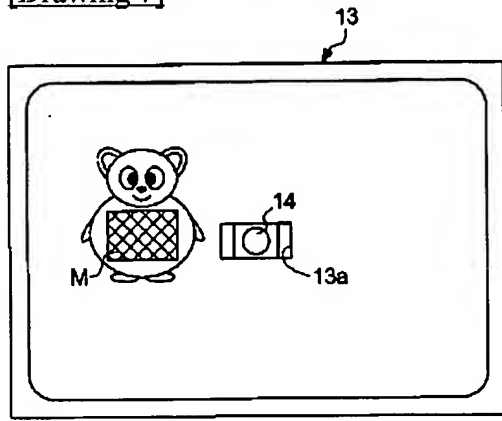


[Drawing 5]

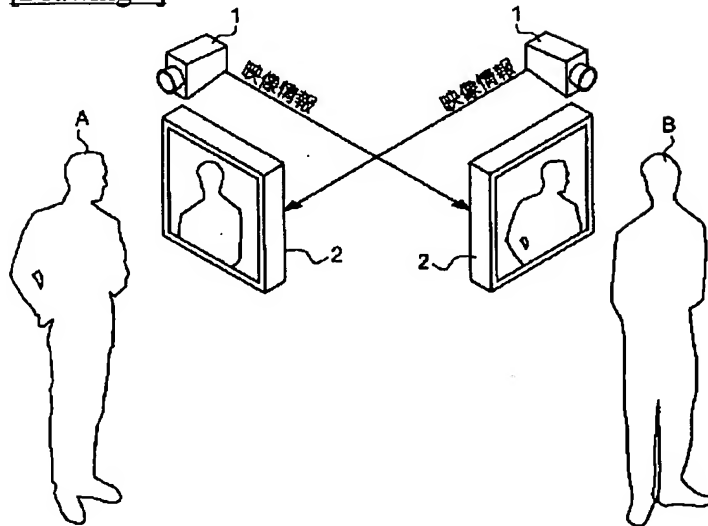


Drawing 5

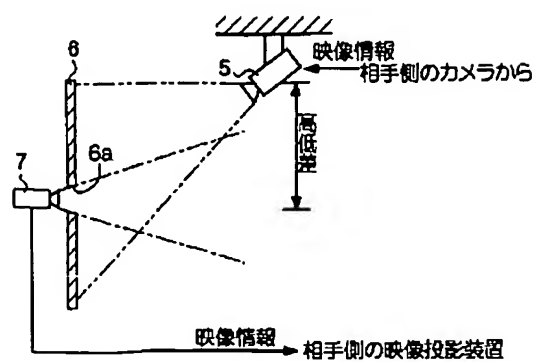
[Drawing 7]



[Drawing 8]



[Drawing 9]



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[Translation done.]